Different paths of change: Home energy efficiency policy in Britain and Germany

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Abstract

This paper looks at long-term change with regard to domestic energy efficiency policy. More specifically, it discusses how the principal policy instruments targeting energy use in homes in the UK and Germany changed over time. The UK was the first country in the world that introduced obligations on suppliers to save energy at the customer end in 1994. Since then this policy changed rapidly and is now the principal instrument to deliver energy savings in the housing stock. Germany put in place large loans and grants schemes to finance residential energy efficiency measures. The CO_2 Building Rehabilitation Program started in 2001 and was modified frequently over the last decade. This paper aims to answer three questions: First, how did the two policy instruments change over time? Second, which long-term pressures caused such a remarkable shift and what were the key drivers of that change? Third, how does policy change in the UK compare to Germany?

Introduction

Understanding under which conditions policy change is likely to be feasible can help a great deal when it comes to future policy design. Too often policy proposals are doomed to fail because the constraints and drivers of policy change are not paid sufficient attention. This is particularly true for energy efficiency policy where proposals for new policies had been bold and ambitious, but were watered down in the policy process, not generating the promised results.

Some of the most frequently cited drivers for rapid policy change are crises such as energy price shocks (Campbell, 2004). The oil crisis in 1973 is a good example of policy change induced by crises in the form of non-linear price signals. Whereas before energy efficiency was of very limited political concern, this changed almost overnight (Eyre, 1997). The oil crisis created a conservationist approach to energy use where there was none before (Perez-Guerrero, 1975). However, while unexpected sudden crises type events certainly can explain some of the shifts in energy efficiency policy, many of the more recent changes to public policy were the result of more gradual and long-term pressures such as constantly high energy prices. Similarly, the issue of climate change poses a challenge to energy efficiency policy that is more gradual in its character. Many of the policy shifts that happened in energy efficiency, particularly the recent changes, are to a large extent influenced by concerns about climate change. Some scholars even claim that in the UK climate change and energy policy converged and are no longer discrete policy areas (Lovell et al., 2009).

Considering the above, this paper looks at the process of policy change in the context of home energy efficiency policy in Germany and the UK, two countries that are internationally recognised for their ambitious home energy efficiency policies. Policy change can refer to various features of public policy such as the policy goals, the policy instruments, and the setting of policy instruments (Hall, 1993). This paper focuses on two *policy instruments* and their development over time: the principal policy instruments for home energy efficiency in each country respectively that both display a high degree of policy change. The criterion applied to identify the principal policy instrument is its contribution to carbon emission reductions in the domestic sector compared to other policy instruments targeting the housing sector, i.e. the one with the largest effect on reducing carbon emissions is deemed the principal policy

instrument. Following this logic, in the UK this is the obligation on energy suppliers to save energy at the customer end. Germany's key policy instrument is a loan and grant scheme run by the KfW (Kreditanstalt für Wiederaufbau), the German Reconstruction Loan Corporation.

The structure of this paper is as follows: First, the paper introduces two recent theories of policy change and gradual pressures that helped inform the research. Second, a brief overview of the respective policy instruments, their basic architecture in the UK and Germany, and their change over time is presented. This includes an indicative evaluation in terms of the achieved energy and carbon savings. Third, the patterns of policy change in the two countries are compared drawing out differences and similarities referring to the theories outlined in the first section. Finally, a concluding section discusses to what extent current theories of policy change might help explaining the policy change experienced in Germany and the UK.

Theories of policy change

When approaching policy change, one needs to be clear which elements of policy are actually looked at. Peter Hall (1993) made an attempt of decomposing the term 'policy' into its different elements, namely the *goals* of policy making, the *instruments* deployed to attain those goals, and the *setting* of those instruments. This paper focuses on significant changes of the *setting* of two selected policy instruments over a defined period if time.

There are various theories about why policies change, each with different perspectives on the policy process. No single theory can explain policy change in all circumstances and some theories have more explanatory power concerning certain aspects of policy change than others. The three most prominent theories on policy change are the *Advocacy Coalition Framework* (ACF), the *Multiple Streams* approach (MS), and the *Punctuated Equilibrium* theory (PE) (John, 2003).

CRITIQUING MAINSTREAM THEORIES OF POLICY CHANGE

There is a certain degree of overlap and some scholars argue that ACF, MS, and PE are in fact complementary (Cairney, 2009, John, 2003, Meijerink, 2005, Zahariadis, 1998). All of the three theories of policy change rely on exogenous pressures as the key driver of major policy change: ACF hypothesises that 'significant perturbations external to the subsystem (e.g. changes in socio-economic conditions, public opinion, system-wide governing coalitions, or policy outputs from other subsystems) are a necessary, but not sufficient, cause of change in the policy core attributes of a governmental program' (Sabatier and Weible, 2007, p. 220). MS refers to 'focusing events' such as crises as one of the key reasons for the opening of windows of opportunity which are a prerequisite for policy change (Kingdon, 2002). PE also relies heavily on external events as the key driver of policy change (Baumgartner and Jones, 1993, 1991).

The problem of such an approach is that it puts the focus on the key external events that create pressures for change but not on the complex search process that follows whereby actors actually determine what changes to make (Campbell, 2004). Also, there is evidence that despite a crisis and the expectation of major policy change sometimes only minor change takes place (Birkland, 1997, Nohrstedt, 2008, Walgrave and Varone, 2008). Supporters of all the three theories of policy change recognise the need for a better account of the role of external pressures for policy change. Reviewing the ACF, Weible et al. (2009, p. 128) admit that 'there is much to learn about the intervening steps between an external perturbation and major policy change'. Similarly, John (2003, p. 489) asks PE scholars about the relationship between the nature of the policy input and the character of the policy output. There is no convincing account for the causal mechanism of the independent variable (external pressure) and the dependent variable (policy change).

That is particularly true for the understanding of gradual pressures building up and reaching a tipping point. The focusing event might just be the tip of the iceberg and act as a valve for accumulated pressure (Birkland, 1997). On a similar note Weir (1992) convincingly stresses that MS is ahistorical, because it does not sufficiently acknowledge the policy legacy of the past and how this impacts on policy making in the present. Responding to such criticism, Zahariadis (1999) acknowledges that more empirical research is required to better understand how processes such as incrementalism and path dependency affect MS. There seems to be a general tendency in political science to neglect cumulative causes and to focus on 'causes and outcomes that are both temporally contiguous and rapidly unfolding' (Pierson, 2003, p. 178).

A NEW LENS ON POLICY CHANGE

This paper looks through a relatively new lens at policy change by employing the concept of 'friction' that was recently developed by PE scholars as a response to some of the criticism (Baumgartner et al., 2009, Jones and Baumgartner, 2005). Friction can be used to understand the build-up of gradual pressures resulting in policy change rather than just the impact of major external events on the policy process. Similar ideas have been explored by historical neoinstitutionalist theorists such as Paul Pierson (2004).

Friction

The idea of friction is a relatively recent addition to PE theory (Baumgartner et al., 2009, Jones and Baumgartner, 2005). The concept of friction is based on the idea that policy makers (because of their bounded rationality and cognitive limits) can only deal with a limited number of questions at a time, and the multiple institutional venues constrain and slow down the policy response to policy inputs. Hence, there is a misbalance between policy inputs and policy outputs. As a result, some issues are not dealt with and pressure starts to build up in the system. Baumgartner et al. compare the mechanism to earthquakes:

> Violent earthquake results from the friction and the associated buildup of pressure, not any momentary increase on the forces pushing to overcome the friction. At any given time, the response to the pressure is out of synch with the level of pressure applied: friction causes the linkage between inputs and outputs of the system to be disproportionate - underresponse because of friction, then overresponse in response to built-up pressures. (Baumgartner et al., 2009, p. 607)

Another metaphor for friction is a sandpile. The steady drop of sand grains on a flat plate does not lead to a constant flow of grains falling of the plate. In contrast, usually when one grain is added to the pile nothing happens and a sandpile builds up. But sometimes when one grain is added to the pile the system collapses in rapid landslides. This pattern is due to the friction of the sand and would not occur if material without friction was used (Jones and Baumgartner, 2005).

The policy process follows a similar logic, Baumgartner et al. argue. Policy makers need to prioritise some policy inputs and neglect others. As a result, decision makers underrespond to issues if they remain below a certain threshold, and only concentrate on those areas where concern is great requiring immediate attention. After an issue passes the threshold overresponse may take place as a result of past negligence and the built-up pressures. Therefore friction 'is not an absolute barrier to action, but rather a major hinderance. As it operates, pressure can mount, making change when it does occur, more profound' (Jones and Baumgartner, 2005, p. 88).

Slow-moving processes

Complementary to the recent developments in PE theory, Paul Pierson's work on 'tipping points' and long term processes (2004) can contribute valuable insights. Pierson's book 'Politics in Time' is one of the most influential contributions to the strand of historical institutionalist theory (Bulmer, 2009). Pierson (2009, p. 40) convincingly illustrates how the social sciences have mainly focussed on short term policy change with regard to both the causes and the outcomes of change:

> In many contexts, however, a long, slow erosion of the status quo may be a crucial factor in generating policy change. What may seem like a relatively rapid process of reform is in fact only the final stage of a process that has in fact been under way for an extended period.

Slow-moving processes may involve threshold effects that 'have a modest or negligible impact until reaching some critical level, which triggers major changes' (Pierson, 2003, p. 182). The earthquake example referred to by Baumgartner et al. falls into this category, as do avalanches and the sand pile example. As the system reaches the threshold relatively minor fluctuations become increasingly likely to trigger change. By focusing just on those minor fluctuations, one misses an analysis of the preceding, long-term build-up of pressure. The exact level of the threshold is contingent; it depends very much on the particular context which is why claims about the nature and the importance of thresholds need to be made with care (Pierson, 2004).

Relevance for home energy efficiency policy

In more recent years home energy appears to be largely driven by gradual pressures such as climate change and high energy prices. Therefore, this paper tries to understand changes in home energy efficiency policy through a relatively new lens on policy dynamics and gradual pressures as outlined above. It does not yet, however, derive and evaluate a number of hypotheses based on the theories, a task that will be accomplished at a later stage as part of the author's doctoral research project. The preliminary interpretations offered in this paper are nevertheless informed by the theories outlined above.

Background

Below the basic logic of the two principal home energy efficiency policy instruments is outlined for each country.

UK: ENERGY EFFICIENCY OBLIGATIONS ON ENERGY SUPPLIERS

In the UK, the Supplier Obligation (SO) is the most important instrument to deliver energy and carbon savings in the domestic sector (OFGEM, 2005). Both the 2004 and 2007 Energy Efficiency Action Plan highlight the SO as the principal policy mechanism to deliver energy savings in the domestic sector (DEFRA, 2007, 2004). As outlined in the Low Carbon Transition Plan, future GHG emission reductions in the domestic sector are assumed to come mainly from an extension of the SO with an increasing target going forward (DECC, 2009).

The basic concept of the SO is that Government imposes a savings target on energy companies that has to be achieved at the customer end. The target may relate to energy consumption or carbon emissions. In the UK, the target is set by the Department of Energy and Climate Change (DECC) for a defined period of time. The energy regulator, OFGEM, is responsible for administering the SO and enforcing it. It defines individual savings targets for each energy company. The energy companies then contract installers of energy saving measures that carry out the work in homes according to a defined standard and with a certain benchmark for energy and / or carbon savings. Alternatively, energy companies may choose to work with the occupants directly. In the past, energy companies have for example promoted the use of compact fluorescent lamps (CFLs) via mass mail-outs of free light bulbs, although this is now prohibited. Businesses and industrial end-users are not covered by the scheme, they are covered by other policy instruments such as the Climate Change Levy and Climate Change Agreements as well as the recently introduced Carbon Reduction Commitment.

While there was a succession of different SO schemes, the basic logic remained the same. The first SO scheme was called Energy Efficiency Standards of Performance (EESoP) and ran from 1994 to 1998. Its successors, EESoP 2 and EESoP 3, ran from 1998 to 2000 and from 2000 to 2002 respectively. In 2002, the scheme's name was changed to Energy Efficiency Commitment (EEC). EEC 1 was in place from 2002 to 2005 and EEC 2 from 2005 to 2008. EEC was eventually renamed in 2008 to the Carbon Emissions Reduction Target (CERT) that runs from 2008 to 2012. For the post-CERT period a new scheme, called Energy Company Obligation (ECO), is planned. In some instances the name change reflected changes of the SO such as a change of focus from energy to carbon emissions when CERT was introduced (see more details below), but generally it the changing names should not be overrated.

Main changes of the SO

Target

To sum it up, there were two substantial changes: First, the energy savings target was raised significantly since 1994. Second, the target definition changed.

The total energy saving target of the SO in 1994-1998 and 2008–2012 cannot be directly compared, because the EESoP 1 target was defined in term of energy to be saved, whereas CERT

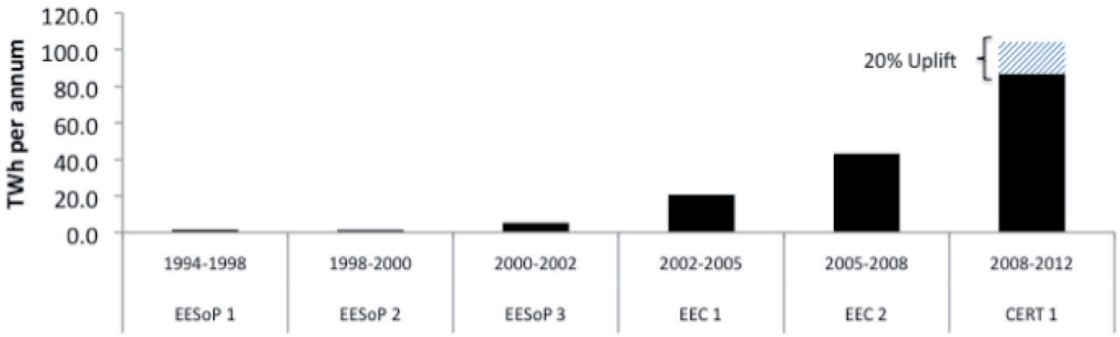

***Figure 1: Annual energy savings target of SO in TWh**. Based on various reports (DEFRA, 2008, OFFER, 1998, OFGEM, 2009b, OFGEM, 2009a, OFGEM, 2008a, OFGEM, 2005, OFGEM and Energy Saving Trust, 2003)*

defines the target in Mt CO_2. According to OFGEM (2008c), the CERT target is equivalent to doubling the target under EEC 2, which was 130 TWh. Taking into account the 20 % uplift in September 2008 and the extension of the scheme to December 2012, the total (implicit) energy savings target of CERT is almost 500 TWh. That means that the original SO target increased eightyfold from 1994-1998 to 2008-2012. However, these figures are again not directly comparable, because the length of the different schemes differs. Therefore an average annual energy savings target is calculated that allows direct comparison of the schemes (see Figure 1).

The implicit *annual* energy savings targets increased almost seventyfold from 1994-1998 to 2008-2012. However, there are further caveats to comparing the targets on a like-for-like basis. The target definition changed over time. Under EESoP 1 and 2, the target only related to electricity. EESoP 3 set a target for both electricity and gas separately. The EEC 1 and 2 targets were fuel standardised, allowing suppliers to achieve savings in homes heated by gas, electricity, coal, oil or LPG. Energy savings were carbon weighted and discounted in line with the HM Treasury Green Book, although the rate changed over time (guidelines for carrying out cost-benefit analysis). CERT then changed the target from energy to carbon emissions and abolished the discounting procedure (OFGEM, 2009b). All this makes it difficult to compare the targets on a like-for-like basis. However, the magnitude of target change is still remarkable.

Cost of programme

As a result of increasing targets, the cost of the programme to energy suppliers went up from just £101.7 million in EESoP 1 (£25 million per year) to £5.5 billion in CERT (£1.2 billion per year). While EESoP 1 and 2 obliged energy suppliers to spend a certain amount of money, later versions of the SO only provided indicative figures that were nonbinding. Suppliers passed on the costs of the SO to their customers. While the expenditure allowance was subject to supply price control (and the 1998 supply price restraint) in earlier versions of the SO (EESoP 1 and 2), prescribing the maximum that could be charged, expenditure in later versions did not fall under such tight control and only indicative figures were provided. The average bill did increase by only £1 per household per year during the EESoP schemes, but by more than £50 per household per year under CERT, meaning a fiftyfold increase over 18 years.

Other

While the overall ambition and cost of the SO is probably the most remarkable change, there were other modifications that are notable:

- The first three SO schemes did not did not set a specific target for disadvantaged customers. However, EEC 1 was the first scheme that put in place a target for the so-called Priority Group, the defined group of disadvantaged customer. 50 % of all savings had to be achieved within the Priority Group (OFGEM, 2001). This target did not change in EEC 2 (OFGEM, 2004). However, under CERT the target was reduced to 40 % (OFGEM, 2009a).
- EESoP 1–3 did not allow trading of energy savings between suppliers. Trading of energy saving obligations was first allowed in EEC 1. Suppliers were allowed to buy certificates from or sell those to other suppliers. However, trading did not play a major role, and only very few suppliers trades parts of their individual targets.

Since EESoP 3 suppliers are allowed to carry over energy savings from one SO period to another. In the beginning this was limited to 10 % of the target, but this limit was abolished with the inception of EEC 1.

GERMANY: LOW INTEREST LOANS AND GRANTS FOR ENERGY EFFICIENCY MEASURES

In Germany, low interest loan and grant schemes for energy efficiency measures are the most important policy instruments for saving energy in the domestic sector and particularly the existing housing stock. The schemes are administered by the KfW Banking Group, a Government-owned development bank. KfW schemes for building refurbishment provide low interest loans and grants to households for specified refurbishment measures including energy efficiency. Making use of both federal funding and national as well as international capital markets, the KfW issues loans with an interest rate lower than the market rates (currently 2.30–2.85 %, depending on the contract period). In addition, some of the funding provided is used to issue grants, although most of the funding is directed towards low interest loans, Homeowners, housing companies, and public bodies can apply for loans and grants at an intermediary bank which assesses the financial circumstances of the application. The intermediary bank forwards the application to the KfW which then approves the loan or grant.

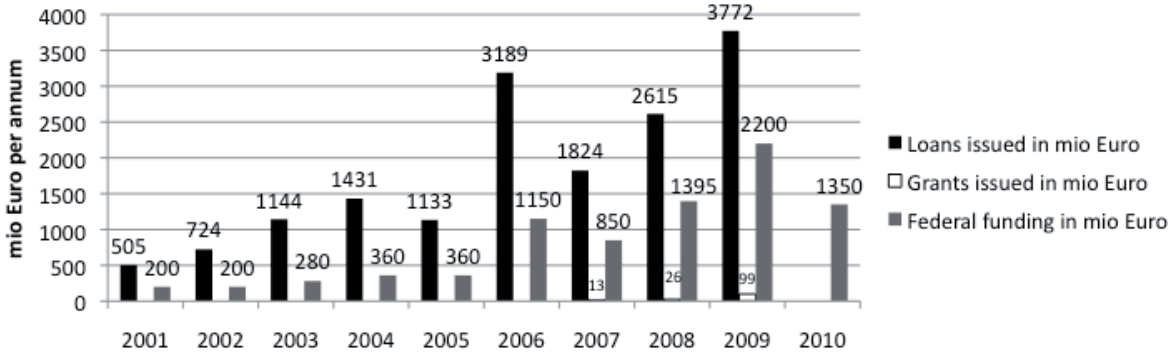

Figure 2: Federal funding of the CBRP & loans and grants issued. *Based on BMVBS (2010) and BMU (2009)*

Several KfW programmes related to housing refurbishment have been running since 1990 addressing energy efficiency to different degrees. For delivering energy efficiency in the existing housing stock the Integrated Energy and Climate Programme highlights the CO_2 Buildings Rehabilitation Programme (CBRP) as the principal policy instrument (BMU, 2007). Also Eichhammer et al. (2006) stress that German home energy efficiency policy is dominated by the KfW scheme (there are other KfW schemes focussing on businesses as well). The CBRP started in 2001 and is still running. It has become the most important instrument in Germany to tackle carbon emissions from existing homes. While the Programme changed over time, the core idea of providing low interest loans (and later grants) remains the same. This paper focuses on the CBRP in the analysis of policy change.

Main policy changes of the CBRP

Funding and loans/grants issued

As already indicated above, the annual funding by the federal Government to support the CBRP changed significantly over time. The loans issued by the KfW more or less follow the federal funding (Figure 2), and on average the value of loans issued is about three times the federal funding provided in a given year (BMU, 2009, BMVBS, 2010). Funding for the CBRP increased between 2001 and 2006 with a major step change in 2006 when funding almost quadrupled as part of the new government's economic stimulus package. However, since then the picture is much more mixed and funding levels go up and down every year with future funding levels being very uncertain.

Grants were only issued from 2007 onwards and remain at a comparably low level when looking at the scale of loans provided by KfW. However, since the introduction of grants in 2007, the amount of grants increased more than sevenfold by 2009.

Other changes

The packages of measures eligible for funding from CBRP changed over time. In the beginning, only four packages of measures could receive funding from the CBRP. Further packages were added to the programme later on whereas others were taken out of the CBRP. In January 2007, in addition to the packages a new category of eligible measures was introduced: All refurbishments achieving the minimum energy efficiency performance of new buildings as prescribed in the Energy Saving Ordinance were offered a 5 % grant. For refurbishments resulting in energy consumption being 30 % lower than the minimum energy efficiency performance of new buildings defined in the Energy Saving Ordinance the grant offered was 12.5 %. Furthermore, a special opportunity for pilot projects achieving 50 % or more energy efficiency of new build levels was created (KfW, 2006b, Zentrum für Umweltbewusstes Bauen, 2007).

BRIEF EVALUATION OF POLICIES

This section provides a brief evaluation of the two policy instruments in terms of their effectiveness, i.e. the carbon emissions and energy saved compared to the financial resources spent.

Data sources – UK

From the inception of the SO there were requirements to undertake monitoring of the measures installed in order to check that the energy savings assumed were in line with the actual savings achieved. A sample of all households that received energy efficiency measures had to be monitored during all obligation periods of the scheme. For the purpose of this paper, the following sources have been used for the evaluation: EESoP 1-3 (OFGEM and Energy Saving Trust, 2003); EEC 1 (OFGEM, 2005); EEC 2 (OFGEM, 2006, OFGEM, 2008a); CERT (OFGEM, 2009a). The figures used for EEC 2 and CERT do not include the energy and carbon savings carried over from previous obligation periods; only those savings actually achieved under the respective scheme are considered. Savings under EEC 2 are only reported in TWh, and conversion factors from the Department for Environment, Food and Rural Affairs (DEFRA) have been used to convert energy savings in carbon savings taking into account the proportion of different fuels saved as reported by OFGEM. In order to get annual figures for saved carbon emissions the stated carbon savings of EESoP 1-3 and EEC 1-2 were prorated according to annual energy savings, for CERT saved carbon emissions have been reported on an annual basis by OFGEMThe figures are not readily comparable for several reasons: First, the evaluation methodology applied changed over time (for example, energy savings were discounted under early versions of the SO, but this is not any longer done). Second, the figures calculated for this paper are based on the assumptions outlined above and need to be revised for a

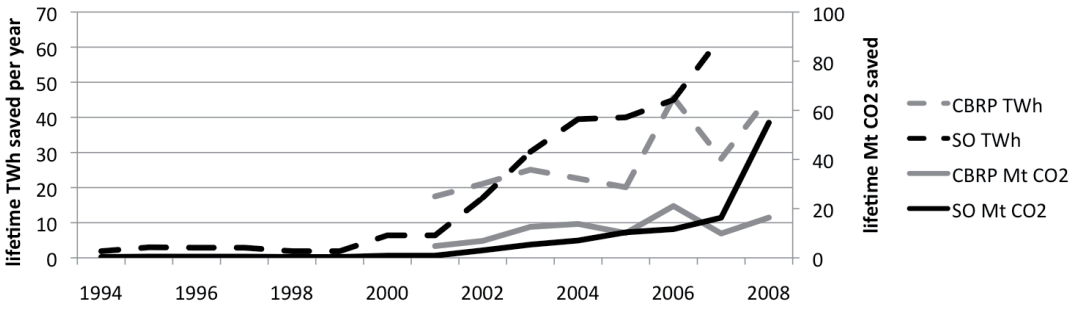

***Figure 3: CO_2-emissions in mt lifetime emissions and TWh saved per year**. Own calculations based on various sources (Clausnitzer et al., 2007, Clausnitzer et al., 2008, Clausnitzer et al., 2009, Doll et al., 2008, IER and PROGNOS, 2004, Kleemann et al., 2003, Kleemann and Hansen, 2005, Kuckshinrichs et al., 2010, OFGEM and Energy Saving Trust, 2003, OFGEM, 2005, OFGEM, 2006, OFGEM, 2008a, OFGEM, 2009a)*

like-for-like comparison. However, the purpose of this section is to give a general estimate of the energy and carbon savings achieved and the figures calculated should suffice.

Data sources – Germany

The effects of the CBRP have been evaluated several times, including the induced energy and carbon savings. Figures for 2001 are provided by Kleemann et al. (2003), who conducted the first detailed evaluation of the Programme. Kleemann et al. did not use actual data on energy use before and after the refurbishment measures were undertaken. Instead, they used the IKARUS space heating model to estimate the energy and carbon savings of the different measures for different types of buildings. Those figures were then extrapolated to all of the buildings that received KfW funding. No such detailed evaluation exists for the years 2002-2004, but Doll et al. (2008) provide estimates for the carbon savings achieved in these years, quoting an unpublished presentation of the Federal Ministry of Transport, Building and Urban Development (BMVBS) in 2006. IER and PROGNOS (2004) provide figures for the energy savings achieved in 2002 and 2003. For the period of 2005 to 2008), Clausnitzer et al. (2007, 2008, 2009) carried out detailed evaluations of the programme, including the energy and carbon emissions saved. Clausnitzer et al. (2007) surveyed a sample of the loan and grant recipients, sense-checked the results by using a software tool, and visited a sub-sample of properties. The survey results were extrapolated to all of the properties that received KfW funding. Clausnitzer et al. (2008, 2009) used a similar method in their evaluations.

Note that the studies cited above calculated the annual reduction of carbon emissions rather than the induced lifetime CO_2 emissions reductions. However, the annual reductions can be converted into lifetime emissions saved by assuming an average lifetime of measures of 30 years, as shown by an additional analysis complementing the evaluation of Clausnitzer et al. (2007) by Gabriel and Balmert (2007).

Comparison of savings

A comparison of the data derived is subject to various limitations because the energy and carbon savings accounting methodology differs in the UK and Germany. Therefore the following remarks have to be taken with a pinch of salt.

In the last 10 years both schemes generated savings of carbon emissions and energy consumption of a comparable magnitude (the CBRP did not exist before 2001 and the SO was at a very low level before EEC 1). In more recent years, the SO delivered higher savings than the CBRP (Figure 3).

From 2002 to 2008 about 2 billion Euros were spent by energy suppliers as a result of the SO (estimate based on indicative figures provided by various OFGEM reports cited below Figure 3). According to the BMVBS (2010), in the same period federal funding for the CBRP amounted to more than twice as much (about 4.5 billion Euros). In case of the SO the energy customers paid for the scheme with their bills, while the CBRP funding was based on taxpayers' money. Considering that both programmes led to comparable energy savings, the question remains why the CBRP required significantly more funding. One reason could be the different energy efficiency performance of the building stock; dwellings in Germany are considered more energy efficient than in the UK. Hence energy savings are more costly as the low hanging fruits have already been picked. However, a more detailed analysis would be required in order to answer that question confidently.

Comparative analysis of change in the UK and Germany

Keeping in mind the recent theoretical advancements on gradual policy change and slow moving processes, the paper will now provide some (preliminary) explanations of why we can see the policy change that happened over time. The explanations are based on an analysis of government documents and, in case of the UK, various reports by the Environmental Data Services (ENDS) Report. Note that this is not a comprehensive list of all the important factors; also, the explanations provided below are not distinct, but rather interrelated. Further research needs to be carried out in order to investigate the validity of the claims made and the underlying causal mechanisms. Because it would be a Herculean task to analyse the policy dynamics of the two instruments in all details, within this paper only a few notable examples will be looked at. When comparing the UK and Germany, there are similarities as well as differences concerning the drivers of the policy change described.

SIMILARITIES

Climate change

While climate change affects a whole range of different sectors, it is particularly relevant for home energy efficiency policy, because homes in the UK and Germany are responsible for a large proportion of total carbon emissions. In both countries climate change was a major driver of policy change of the principal home energy efficiency policy. At its inception, the German CBRP was part of the newly established National Climate Protection Program, and the purpose of the scheme was also mirrored in its name: CO_2 Building Rehabilitation Program (BMU, 2000). Extensions of the CPRB in 2003 and 2005 were justified with regard to its importance for climate policy. The CBRP also featured in the 2005 National Climate Protection Programme (BMU, 2005), as well as the 2007 Integrated Energy and Climate Programme (BMWi and BMU, 2007). Most recently, the CBRP was highlighted in the 2010 Energy Concept as one of the key policies to reduce carbon emissions in the domestic sector.

Similarly, the first British SO, EESoP1, was introduced as a result of national climate policy: together with the E-factor (the energy efficiency price premium for gas, see below), EESoP 1 was supposed to raise money for the Energy Saving Trust (EST) that was established by Government, British Gas and public electricity supply companies in 1992 to reduce home energy use and the associated carbon emissions. The EST played a key role in the Government's climate policy strategy for the domestic sector as outlined in the 1994 UK Climate Change Program (HM Government, 1994). Climate change continued to play a major role for the SO. Another example is the 2006 Climate Change Bill that introduced the Carbon Emissions Reduction Target (CERT). While earlier SO scheme names always referred to energy efficiency, CERT explicitly focused on carbon emissions. CERT became the most important climate policy in the domestic sector and is also supposed to deliver the majority of domestic carbon savings in the future (DECC, 2009). However, earlier versions of the SO were also driven by discussions about climate change following the Rio Earth Summit in 1992.

Rising energy prices

Rising as well as generally high energy prices also played an important role for the development of the SO and CBRP. In the UK, this was probably most notable in 2008, when residential energy prices went through the roof, while energy suppliers reported large profits:

Residential gas prices in 2008 increased almost by 50 % in real terms in just four quarters. This was a result of rising wholesale gas prices in continental Europe, where gas prices are contractually linked to oil prices. Similarly, electricity prices went up by almost 30 %, also mainly due to rising wholesale gas prices. In the context of increasing energy bills, there were calls in early 2008 for a windfall tax on energy suppliers. A heated discussion started after OFGEM reported to the Treasury and the Committee on Business and Enterprise that energy companies made £9 billion profit from EU ETS permits which were issued for free. In January 2008, OFGEM proposed a windfall tax on the major energy suppliers to help the fuel poor (OFGEM, 2008b). Just a few weeks after the OFGEM proposal, Government held a meeting with the heads of major energy suppliers and told them that they might face a levy on their profits to help the poor. As expected, the proposals were not met with great enthusiasm by the energy suppliers. There were expectations that the 2008 Budget might introduce a windfall tax, but this was not the case.Discussions about a windfall tax continued and in July 2008 the House of Commons Committee on Business and Enterprise argued that 'there is a compelling rationale for at least a modest, one-off top-slicing of these gains to help fund action to reduce the energy bills of vulnerable families in the long term' (House of Commons Business and Enterprise Committee, 2008, p. 47). Increasing profits made by energy suppliers such as Centrica after raising domestic fuel prices by 35 % led to a renewal of calls for a windfall tax in August 2008. There was, however, no agreement in Government on the matter – Chancellor Alistair Darling and John Hutton, the Business Secretary, opposed a windfall tax on the basis that energy companies needed extra funds to expand low carbon energy sources. More than 70 Labour MPs signed a petition that called for a windfall tax and hoped to make the issue one of the dominating themes of the party's annual conference in September, among them Geoffrey Robinson, a key alley to Gordon Brown, who devised the windfall tax on energy companies in 1997. In early August 2008, Government examined different alternatives to a windfall tax. One of them was to oblige energy companies to spend the bulk of the money under CERT in the first two years, and also to increase the share spent on helping the fuel poor. Raising the proportion of auctioned EU ETS permits and a carbon levy was also considered. Government eventually designed a £1bn package of new funding and measures to tackle fuel poverty and threatened the energy companies with a windfall tax in case they did not sign up for the package.

On 11 September 2008, Government finally revealed the package they negotiated with the energy companies – the Home Energy Saving Programme. The package included an increase in the existing CERT target by 20 % with a new target of 185 million lifetime tonnes of CO_2 for the period April 2008 - March 2011. That implied additional expenditure by the energy suppliers of an estimated £560 million (HM Government, 2008). Government argued that the programme had advantages over a windfall tax and that 'by choosing this route the Government can more swiftly help families cut fuel bills now and in the medium term; help secure the long-term investment in new low-carbon energy infrastructure this country requires; and help keep prices down' (HM Government, 2008, p. 2).

In Germany energy prices impacted on the CBRP too. Protecting consumers from high energy prices and future price hikes was used frequently as an argument by politicians to justify the expenditures on the CBRP. Furthermore, demand for KfW loans and grants was high as a result of rising energy prices. This way, rising energy prices put indirect pressure on increasing the funding for the CPRB.

Hence energy prices impacted on policy change in two ways: First, non-linear price signals such as those in 2008 put pressure on Governments to act. Second, constantly high energy prices acted as a more gradual pressure similar to the climate change issue. Interestingly, raising the SO target by 20 % led to an *increase* of energy prices as suppliers are allowed to simply pass through the costs of the SO to the energy customers. Therefore the move had no significant financial impact (if at all)

on energy suppliers' profits (which was the focal point of the debate). Government presented the decision as if energy suppliers had to spend an additional £1 billion on energy efficiency without mentioning that consumers were to pay for this in the end. It seems that energy companies' pleas for not putting a windfall tax on them because they desperately needed to invest in new infrastructure convinced the government.

Pierson's concept of tipping points seems to reflect some of the developments described above. With energy prices already being at a fairly high level after slowly rising since 2000, a further increase in early 2008 reached a threshold pushing high energy prices high up on the political agenda.

DIFFERENCES

Venue change

One of the levers of policy change discussed in the literature on the theory of policy change is the so-called venue change. Venue change refers to situations when the institutional location of decision authority changes (Baumgartner and Jones, 1993). Such a venue change occurred in the UK in 2000:

In 1994, the electricity regulator, OFFER, put energy efficiency standards of performance (EESoP) on the Public Electricity Suppliers (PESs), the fourteen companies created when the electricity market in the United Kingdom was privatised in 1990. Over a 4-year period EESoP 1 raised about £100 million for energy efficiency projects, equivalent to £1 per customer per year (Owen, 1997). However, OFFER did not raise the amount of money expected by ministers, and OFFER's Director General had concerns that higher obligations 'would raise issues more appropriately dealt with through general fiscal policy' (ENDS, 1994a). Also the second EESoP scheme, which operated from 1998-2000, did not raise significantly more funds than EESoP 1. Using similar arguments, OFGAS rejected such a scheme for the gas sector entirely (see more details in section on change of key personnel). Without changes in primary legislation it looked like further measures would be extremely difficult to implement. The new Labour Government that came into power in 1997 announced a review of utility regulations. In 2000, the proposals took shape and were passed through parliament as part of the Utility Bill. The Bill gave the Secretary of State powers, by order, to impose energy savings targets on gas and electricity utilities. This resolved some of the conflicts over the first SO schemes, which struggled to get regulators' support due to conflicting duties and unclear responsibilities. The Utilities Bill directed the responsibility for target setting to Government and obliged the regulator to implement the schemes that would be needed to reach the targets. This enabled Government to significantly extend EESoP, imposing much more ambitious targets on energy companies (ENDS, 2001). Government set the first target in the Electricity and Gas (Energy Efficiency Obligations) Order 2001. The target of the old EESoP 3 scheme was only 11 TWh (4.9 TWh Electricity & 6.1 TWh Gas), whereas its successor, EEC 1, put a much higher target of 62 TWh on energy suppliers (OFGEM, 2005).

In Germany, no such venue change occurred. The CBRP was always run by the KfW and funded by the BMVBS and its predecessors.

The venue change that occurred in Britain resulted from a lengthy political debate about the role of the energy regulators and their unwillingness to increase expenditure for energy efficiency measures. In order to realise substantial carbon emission reductions in the domestic sector modifying the institutional framework appeared to be the only option. Hence the venue change was a deliberate means to achieve carbon reduction goals in the housing sector rather than an unrelated coincidence. With regard to the theories on policy change and gradual pressures the following observations can be made: Due to the inability of the institutions in place (in this case OFGAS and OFFER) to raise the energy saving target, the pressure to generate the carbon emission reductions elsewhere increased. Directing the target setting powers to central government rather than the regulator was seen as the only way of dealing with the pressure to achieve carbon emission reductions in the housing stock. The concept of friction developed by Baumgartner and Jones assumes limited processing capabilities of institutions resulting from the inability to deal with all issues at all times. However, in this case the institutional structure itself did not allow the translation of policy inputs (pressure to cut carbon emissions) into policy outputs (effective SO).

Budget constraints

Budget constraints can act as a powerful force on policy instruments and their calibration. In other words, pressure to cut public spending can transcend the boundaries of public finance considerations and affect the home energy efficiency subsystem, an effect known as 'subsystem spillover' (Howlett, 2002). If the policy instrument in question is heavily depended on government funding, austerity measures may as well include reducing expenditures for the instrument. In cases where the policy instrument is more or less independent of budget allocation austerity measures are much less likely to impact on its settings. The CBRP and the SO represent such cases: in Germany the CBRP was subject to austerity measures whereas the SO in the UK remained untouched, although details of the post-CERT scheme, the Energy Company Obligation, are still to be seen with detailed proposals due later this year.

In Germany, the CBRP was threatened by cuts announced in the draft budget for 2010 in December 2009. As a result of the increased spending in 2009, only 1.1 billion Euros were left in the budget for the scheme, compared to almost 2.2 billion Euro that had been spent on the CBRP in 2009. The financial contributions to the KfW programmes were put on hold in January 2010 and KfW stopped approving applications for loans and grants. The reason was that the budget for the year 2010 was not yet in place and that demand for loans and grants was higher in 2009 than expected. However, shortly after the CBRP was put on hold, and following objections voiced by various industry associations and NGOs, the Bundestag approved preliminary spending with regard to the KfW programmes. The construction industry association Bundesvereinigung Bauwirtschaft asked the Government to top up funding for 2011 in order to make sure that the 1.5 billion Euros per annum announced in the investment package in 2008 would be provided. However, in June 2010, a leaked letter to the coalition MPs from the Minister of the BMVBS, Peter Ramsauer, unveiled that further cuts of around 50 % of the CBRP were planned for 2011 in addition to the cuts already made earlier, leaving the scheme with only 450 million Euro. This was later confirmed in a meeting of the MP Committee on Transport, Construction, and Urban Devel-

opment. Reasons given for the cuts were mainly that the 'debt brake', a measure to freeze public debt that was introduced into the Constitution, would not allow for the programmes to continue at current levels. Also, it was argued by the Conservative-Liberal Coalition Government that low interest rates would enable investors to find loans elsewhere. As a result of the cuts KfW announced in August 2010 that single measures would receive no further funding from 01 September 2010. Also, the funding stream for special measures only continued to support advice on refurbishment by energy efficiency experts, but not replacement of storage heaters and optimisation of heating systems.

In Britain the SO is paid for by the energy companies but energy suppliers are permitted to pass the costs through to households as part of their energy bill. Therefore the treasury has no involvement in the financial transactions taking place and does neither benefit from nor contribute to the SO. Hence even substantial spending cuts as seen at the moment cannot affect the SO.

Support for struggling construction industry

Another case of subsystem spillover effects can be observed with regard to the construction industry. The CBRP in Germany was heavily influenced by developments in the struggling construction industry whereas this issue played no significant role in the UK. An explanation can be found when looking at the development of the construction industry in the two countries:

Between 2000 and 2008 the number of jobs in the German construction industry dropped by 35 % with turnover declining by 14 % in the same period (Statistisches Bundesamt, 2010). The late 1990s were characterised by a similar trend. Already at its inception, the CBRP was justified with securing construction industry jobs alongside delivering climate protection. References to the construction industry can be found throughout the CBRP's development: In a policy statement in March 2005, Chancellor Gerhard Schröder promised to extend the CBRP to the end of 2007, keeping it at the same level as it was in 2005 (Bundesregierung, 2005b). He referred to the need to support jobs in the construction industry particularly in small and medium enterprises. This was confirmed in the twenty point programme for economic growth, in which Government promised to provide 720 million Euro for the scheme's extension, again with a reference to the construction industry alongside with climate change (Bundesregierung, 2005a). Early in 2006, Government modified the CBRP once again, and an uplift of the financial resources provided was announced after a Cabinet meeting in Genshagen on a programme for economic growth and employment. For the period 2006-2009, Government promised to allocate 4 billion Euro, a significant increase of the programme's ambition (Bundesregierung, 2006). This was part of the initiative 'Housing, Environment, Growth', which featured in the investment programme announced after the Cabinet meeting. One of the key reasons for the uplift provided by Construction Minister, Wolfgang Tiefensee, was job creation and keeping jobs in the construction industry (KfW, 2006a). Similar references can be found in later policy documents.

Contrary to Germany, very few, if any, references to the construction industry can be found in policy documents on the SO. An explanation could be the different trends in the construction industry: while the sector struggled for more than a decade in Germany, from 2000 to 2008 jobs in the British construction industry saw a 34 % increase with economic output of the sector almost doubling (Office for National Statistics, 2010). This is not to say that there is a definitive causal link here but it seems likely that there is.

Change of key personnel in institutions

Change of key personnel can trigger policy change in some instances and is a recognised mechanism in the literature on policy change (e.g. Sabatier, 1988). A good example of the impact of changing key personnel affecting the dynamics of policy change can be found in the UK during EESoP 1 and 2:

In 1991, Sir James McKinnon, the Director General of OFGAS, announced a new gas price control formula to operate from 1992. This formula would include an 'E-factor' allowing gas suppliers to pass 100 % of the costs of energy efficiency projects approved by the Director General through to gas customers. McKinnon expected that around £50 million a year might be spent on energy efficiency measures (Owen, 2006). Money raised via the E-factor was supposed to help fund the Energy Saving Trust (EST) that was established by Government, British Gas and public electricity supply companies in 1992 to reduce home energy use and the associated carbon emissions (Owen, 1997). However, in 1994 Claire Spottiswoode, the new director of the gas supply regulator OFGAS, rejected raising money for energy efficiency measures administered by EST via higher gas prices (ENDS, 1994b). Such decisions, she argued, were within the realm of elected politicians and could not be decided by the regulator (ENDS, 1994a). As a result, British Gas submitted a greatly scaled down package of EST projects to OFGAS, but most of their proposals were subsequently rejected by the regulator (ENDS, 1995). In the end less than £2 million compared to the £50 million announced by McKinnon was spent by the time the E-factor had ended in March 1997 (Owen, 2006). Claire Spottiswoode resigned in 1998 and was succeeded by Callum McCarthy who was much more sympathetic to energy efficiency programmes than his predecessor. In 1999, EST urged Government to extend EESoP 2 as it was coming to an end in 2000. EST hoped that gas suppliers would also be covered (ENDS, 1999a). The House of Commons Environmental Audit Committee took EST's concerns forward and recommended the extension of EESoP, including a separate scheme for gas suppliers (House of Commons Environmental Audit Select Committee, 1999). Within four days after publication of the Committee's report, newly created OFGEM (provisional merger of OFFER and OFGAS, later formally enacted in the Utility Bill) issued proposals to extend the electricity EESoP scheme for two years from April 2000 and also proposed a new EESoP scheme for gas suppliers for the same period with a savings target even higher than the electricity SO (ENDS, 1999b, OFGEM, 2000). This was a significant shift considering OFGAS' past opposition to an EESoP type scheme for gas and can be explained to a large extent with the appointment of a new Director General in 1998.

With regard to the theoretical lens adopted in this paper the following observation can be made: due to the resistance of its director, the institution in question (in this case OFGAS) could not respond to and process policy inputs such as pressure to deliver energy savings at the customer end. This was not a case

of limited abilities of processing information, which is the sort of causal mechanism the friction concept by Baumgartner and Jones refers to, but rather a deliberate decision by the head of the organisation not to respond to the pressure put on the institution. However, the pressure to act built up in the meantime, and Government needed to find a way of delivering energy and carbon savings in the housing sector if the reduction targets were going to be met. Once a new director took office, who was more open and cooperative to respond to the demands, policy change took place. It seems that a single person can play a significant role in resisting external pressure for an organisation as a whole. If external pressure builds up over time, it can be released fairly quickly if a more responsive person replaces the former.

Fuel poverty

While there is fuel poverty both in the UK and in Germany, the issue was always much higher up on the agenda in Britain, where fuel poverty is an important driver of energy efficiency policy, and became a distinct issue of public concern following the oil crisis in 1973-1974. Fuel poverty in the UK is defined as the need to spend more than 10 % of household income on all energy use in order to maintain a satisfactory heating regime and other energy services (Boardman, 1991). The importance of fuel poverty for the energy efficiency debate is manifested in the launch of the UK Fuel Poverty Strategy in 2001. The SO was always supposed to help those living in fuel poverty, but only the implementation of EEC 1 required suppliers to spend a fixed proportion of money on energy efficiency measures in homes of disadvantaged customers in the so-called Priority Group. Although CERT reduced the Priority Group target from 50 % to 40 %, the recent extension of CERT to 2012 also included provisions for a Super Priority Group, i.e. the most disadvantaged customers within the Priority Group.

Unlike the UK, there is no systematic fuel poverty policy in Germany. The debate has not gone beyond various pilot projects and statements by different stakeholders. Hence there are very few references to fuel poverty in the development of the CBRP. It is also notable that the CBRP is essentially a loan scheme offering loans to those who can proof their financial credibility. The fuel poor are unlikely to receive such loans.

There is no convincing explanation for the different level of attention fuel poverty receives in the two countries. One could argue that fuel poverty is simply not a problem in Germany, which is why it does not constitute a major policy issue. However, there is evidence that this is not the case, and that a substantial number of households is affected by it. Unfortunately, there are no reliable estimates that could be used for a meaningful comparison of levels of fuel poverty (Kopatz et al., 2010). More research is required to investigate why this issue became a major policy area in the UK but not in Germany.

Conclusion

This paper sketched the development of the principal home energy efficiency policy instruments in the UK and Germany from their inception identifying some, but not all, driving forces that impacted on policy change. Both the SO and the CBRP show remarkable and frequent changes in their development, and arguably few people would have expected the two schemes ever reaching the scale they reached in recent years.

Comparing the two cases similarities have been identified such as the impact of the climate change issue on home energy efficiency as well as rising energy prices. There are, however, also idiosyncratic drivers such as fuel poverty in the UK and the struggling construction industry in Germany. In the UK, an interesting venue change took place when central Government took the target setting responsibility for the SO with a major impact on the SO's development. Furthermore, change of key personnel plaid a role in the early days of the SO as did budget constraints more recently in Germany.

Coming back to the introduction of this paper, it seems that home energy efficiency policy, or at least the most important instruments in Germany and the UK, is driven not only by crisis-like events (although those played some role such as the 2008 price hikes and the resulting CERT uplift), but by more subtle gradual and long-term pressures. One of the areas future research should focus on are the casual mechanisms by which such long-term pressures impact on policy change i.e. not just establish that they are important but how they actually affect outcomes of the decision making process. Are there certain trigger points, thresholds, and spill over effects or does the policy system deal with those pressures proportionally? What role do stakeholders play in the process and how do the different actors influence policy change? Why do some issues have a major impact on policy change in one case but not in another? Further research is required to answer these questions appropriately. Home energy efficiency policy promises to be an interesting and rewarding case for doing more research on policy change.

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